

Status of MODIS-N Airborne Simulator

Objectives

- Simulate the majority of atmosphere and land channels of *MODIS-N* prior to launch.
- Obtain measurements of reflected and emitted radiation with a single instrument under a wide variety of earth-atmosphere conditions.
- Compare retrievals of atmospheric and surface properties with nearly simultaneous *in situ* aircraft and surface observations.
- Perform calibration intercomparisons during *MODIS* overflights.

MODIS-N Airborne Simulator

<i>Channels</i>	50
<i>Footprint</i>	2.5 mrad
	45 m
<i>Swath</i>	$\pm 43^\circ$
	34 km
<i>Spectral range</i>	0.55-14.2 μm
<i>Scan rate</i>	6.25 scans/sec
<i>Pixels in scan line</i>	716
<i>Data system</i>	12 channels – 8 bit

<i>Wavelength (μm)</i>	<i>Bandwidth (μm)</i>	<i>Bits</i>
0.550	0.040	
0.659	0.050	8
0.865	0.040	?
0.905	0.030	?
0.940	0.050	
1.630	0.050	8
2.130	0.050	8
3.750	0.150	8 or 10
4.500	0.150	?
4.650	0.150	?
8.550	0.5	10
9.650	0.5	
11.030	0.5	10
12.020	0.5	10
13.300	0.5	8
13.800	0.5	8
14.300	0.5	8

FIRE Configuration

<i>Wavelength (μm)</i>	<i>Bandwidth (μm)</i>	<i>Bits</i>
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0.745	0.010	8
1.630	0.050	8
1.930	0.050	8
2.080	0.050	8
2.130	0.050	8
3.750	0.150	10
4.500	0.150	8
8.800	0.4	10
10.950	0.5	10
11.950	0.5	10
12.950	0.5	8

Instrument Status

- *Wildfire Spectrometer* was delivered to Ames in April, where it underwent numerous laboratory engineering tests. Ames recommended that:
 - The preamplifier gain be increased to permit normal terrestrial targets to be viewed with an acceptable signal-to-noise level.
 - Cables be shielded to reduce radio frequency interference.
 - Power supply induced noise be reduced.
- Dædalus Enterprises is now under a \$200 K contract to modify spectrometer ports 1 and 4 to meet the majority of *MODIS-N* simulator requirements.

Data Processing Status

- MAS Level-0 data will be delivered to SDST in format currently used by Ames for MAMS data.
- ER-2 navigation (INS) data will be supplied by Ames.
- SDST will prepare Level-1B output data.
 - Calibration will be applied to every pixel on every scan line.
 - Output data will consist of 16-bit integers for each pixel, based on original 8 or 10 bit data and scaled appropriately.
 - Blackbody counts, temperatures, and calibration slope and intercepts will also be recorded.

Data Processing Status

- Geolocation
 - Only straight flight tracks will be geolocated, with each flight line being a separate file.
 - Latitude, longitude, solar zenith angle, viewing zenith angle, and relative azimuth angle are computed for every 10th pixel on a scan line.
 - Error checking of INS dataset is checked before geolocation.
- Output Level-1B data
 - Geolocation data stored as 32 bit integers.
 - Data distributed in the netCDF by 9-track tape or 8 mm (exabyte) cassette.

Summary

- The *MODIS-N Airborne Simulator (MAS)* is cheaper and more important than theoretical simulations for developing confident retrieval algorithms.
- *MAS* will be delivered to Ames on October 15 where it will be integrated, calibrated, and flown in the FIRE Cirrus Experiment which begins November 12.
- After FIRE campaign, the *MAS* will be returned to Dædalus where it will be further modified to a full 50 channel spectrometer for use in ASTEX, Brazil, and later airborne field campaigns.